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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,979	03/08/2001	Bjoern Magnussen	ELLIP-004A	2169

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EXAMINER
DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/800,979	Applicant(s) MAGNUSSEN ET AL.	
	Examiner Thomas M. Dougherty	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/08/01* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7, 8 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

Some new formal drawings are required in this application because the figures which are figures of graphs are particularly faint. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the Patent and Trademark Office no longer prepares new drawings. Please additionally check the other figures for the same complaint.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-39 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The description of the sidewalls being "stressed beyond their elastic limit" is somewhat confusing. Does this simply mean that the applied stress results in a plastic deformation, such that the curved shape cited in later claims is achieved?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 11-20, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owen (US 5,109,698) in view of Reuter, et al. (US 5,900,691). Owen shows (fig. 11) a vibratory apparatus, comprising; a vibration source (114a-114n) that converts electrical energy directly into physical motion, and a resonator (12, 14a, 14b) having an opening defined by a cylindrical sidewall (12) which is stressed beyond its elastic limit, as that term is best understood, to hold the vibration element in compression (see col. 5, ll. 21-24), the vibration source being within that opening so that the vibration element is held in compression by the resonator under a defined preload, the vibration source causing the resonator to vibrate in at least a first mode to cause the resonator to move in a predetermined manner. His vibratory element is a piezoelectric element. His cylindrical sidewall is curved. His resonator has a longitudinal axis. His resonator is capable of being bowed such that the cylindrical side wall is curved and inclined towards the piezoelectric element or away from the element (col. 5, ll. 53-62).

His device is not noted as moving a driven element. He doesn't show sidewalls, but instead a cylindrical wall. His vibration source is not clearly press-fit into the opening. He doesn't drive another member via a contacting portion. It is unknown whether he drives his device such that an elliptical motion is generated. He doesn't note how the piezoelectric element is fit into the device.

Reuter shows (fig. 2) a vibratory apparatus for moving a driven element (90), comprising; a vibration source (1, 2) that converts electrical energy directly into physical motion, and a resonator (56, 47, 3) having an opening defined by side springs (56)

which are stressed beyond their elastic limit, as that term is best understood, to hold the vibration element in compression (see col. 2, ll. 26-32), the vibration source being within that opening so that the vibration element is held in compression by the resonator under a defined preload, the vibration source causing the resonator to vibrate in at least a first mode to cause a selected contacting portion (9) on the resonator to move in a predetermined manner. His vibratory element is a piezoelectric element. His side springs are curved. He shows a resilient support element (111, 211) for supporting the apparatus, the support element (111, 211) being interposed between the piezoelectric element (1, 2) and a portion of the resonator opening. Reuter also shows a first mode excited by a first electrical signal applied to the piezoelectric element that results in the selected contacting portion (9) moving in an elliptical motion of sufficient amplitude to move a driven element (90) in a first direction when the apparatus is engaged with the driven element (90) during use of the apparatus. His resonator is excited by a second electrical signal applied to the piezoelectric element that results in the selected contacting portion (9) moving in a second elliptical motion of sufficient amplitude to move a driven element (90) in a second direction (note the two directional arrows on the body of the driven member 90, one of them in hatch) when the apparatus is engaged with the driven element during use of the apparatus. The selected contacting portion (9) is resiliently placed in contact with a driven element (90) that is constrained to move in a predetermined manner and caused to move by the first elliptical motion. The driven element (90) is constrained to move in a predetermined manner and caused to

move by the selected contacting portion (9) engaging the surface. His resonator has a longitudinal axis.

It is not clear that his side springs (56) can be defined as sidewalls as their width dimension (into the paper of figure 2) is unknown. It is not clear that his vibration element is press fit into the opening between the sidesprings. He doesn't show a plurality of these devices. He doesn't note pressing opposing walls to allow the piezoelectric element to be forced between the end walls.

It would have been obvious to one having ordinary skill in the art to employ actual walls, if indeed that feature is lacking, in the device of Reuter at the time of his invention, as such is taught by Owen in his device, either bowed away or toward the piezoelectric element, in order to add strength to the device, as such is noted as being a defect, which Reuter calls "poor rigidity" in the prior art as cited by Reuter at col. 2, ll. 10-15. Whether or not the vibration element is press-fit into the opening or not, or whether it is placed into the resonator by increasing the distance between opposing end walls, does not carry any patentable weight since the claimed structure is the same as either prior art structure in terms of vibration element placement under compression, whether or not it is press-fit. Note that as this is a structure claim, the method of forming the device, i.e. press-fitting, is not germane to the issue of patentability of the device itself. *In re Brown* 173 USPQ 685, in re *Fessman* 180 USPQ 324. Regarding the plurality of devices, it would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate these parts, since it has been held that

mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25, 28, 30, 32 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Marshall, Jr., et al. (US 4,420,826). Marshall notes a method of placing a piezoelectric element (26 in fig. 3) in compression in a resonator, the resonator having end walls (29) and sidewalls (28) defining an opening sized to receive and place the piezoelectric element (26) in compression (col. 4, ll. 4-5), comprising: increasing the distance between opposing end walls (29) enough to allow the piezoelectric element (26) to be forced between the end walls (col. 3, l. 64 to col. 4, l. 3) with a force that by itself could not force the piezoelectric element (26) between the end walls (29) in the original state of the opening, and thereby placing the piezoelectric element (26) in compression while also stressing the sidewalls beyond their elastic limit, as that term is best understood. His sidewalls (28) are curved outward. He shows a resilient mount (27) for the piezoelectric element (26) between the piezoelectric element (26) and one of the end walls (29). The resonator has a longitudinal axis passing through the opening with the sidewalls (28) being on opposing sides of that axis and the end walls (29) on the longitudinal axis.

Claim Rejections - 35 USC § 103

Claims 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 4,420,826). Given the invention of Marshall as noted above, he does not pull opposing end walls apart while forcing the piezoelectric element into the opening nor pull sidewalls apart to achieve the same purpose. This is a clear design choice however, functionally equivalent to the pressing of the sidewalls and as such carries no patentable weight. The general characteristics of either pushing the sidewalls or pulling the endwalls are such that the choice of either as a substitute for the other to obtain the known or naturally expected advantage of the chosen process presents in general a case of good judgement instead of a case of invention.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 4,420,826) in view of Owen (US 5,109,698). Given the invention of Marshall as noted above, he does not pull opposing sidewalls apart while forcing the piezoelectric element into the opening. Owen shows in fig. 21 inwardly configured cylindrical sidewalls. He doesn't note any methodology for placement of the piezoelectric element. It would have been obvious to one of ordinary skill in the art to employ the shape of the sidewalls shown by Owen in the device of Marshall, and use the Marshall means of pressing the sidewalls, but this time outward such that the distance between endwalls grows, since this shape adds strength to the device as noted above, and which shape overcomes the defect of "poor rigidity".

Claim Rejections - 35 USC § 102

Claims 40, 41 and 44-46 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Marshall Jr., et al. (US 4,420,826). Marshall shows (e.g. fig. 3) a resonator for use with a piezoelectric actuator, the resonator having a continuous walled, externally accessible opening sized to receive a piezoelectric element (26) and hold the element (26) in compression, the opening being defined in part by opposing sidewalls (28) that are curved. The sidewalls (28) are curved away from the opening. The opening comprises opposing end walls (29) on a longitudinal axis of the opening, the sidewalls (28) being on opposing sides of the longitudinal axis. A piezoelectric element (26) is located in the opening, the piezoelectric element being sized relative to the opening to stress the sidewalls (28) past their elastic limit as that is best understood. The resonator further comprising a resilient support element (27) interposed between, and held by compression between, the piezoelectric element (28) and one wall (29) defining the opening.

Claims 40-46 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Flanagan (US 5,155,709). Flanagan shows (fig. 1) a resonator for use with a piezoelectric actuator, the resonator having a continuous walled, externally accessible opening sized to receive a piezoelectric element (20) and hold the element (20) in compression, the opening being defined in part by opposing sidewalls (18) that are curved. The sidewalls (18) are curved away from the opening. The curved sidewalls (18) have a uniform cross section for a substantial portion of the length of the sidewall (28). The curved sidewalls (18) have a rectangular cross section. The opening comprises opposing end walls (16) on a longitudinal axis of the opening, the sidewalls

(18) being on opposing sides of the longitudinal axis. A piezoelectric element (20) is located in the opening, the piezoelectric element (20) being sized relative to the opening to stress the sidewalls (18) past their elastic limit as that is best understood. The resonator further comprising a resilient support element (23) interposed between, and held by compression between, the piezoelectric element (18) and one wall (16) defining the opening.

Allowable Subject Matter

Claims 6-10, 21, 26, 29, 33, 35-39, would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to show or fairly suggest use of inclined opposing edges in either a vibration element or body which holds an element for use in press-fitting a vibration element which drives a driven member and which has the claimed structure.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art shows generally piezoelectric elements in a resonator structure typically with elastic walls on its sides. Yerganian ('515) shows in fig. 3 piezoelectric elements which are inclined for the purpose of fit.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

tmd

tmd

May 9, 2002

THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP ~~2100~~ 2800